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JAMES H. McKENNEY, Clerk.

SUPREME COURT OF THE UNITED STATES.

OCTOBER TERM, 1882.

No. 163.

JOSEPH L. HALL,
Appellant,
vs.
MACNEALE & URBAN,
Appellees.

No. 165.

JOSEPH L. HALL,
Appellant,
vs.
MOSLER, BAHMAN & CO.,
Appellees.

Appeal from the Circuit Court of the United States for the Southern District of Ohio.

BRIEF FOR APPELLANT.

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Supreme Court of the United States.

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No. 165.

BRIEF FOR APPELLANT.

Statement of the Case.

This is an appeal from the Circuit Court of the United States in and for the Southern District of Ohio.

The controversy in that court related to two devices which are designed to be used in the manufacture of burglar-proof safes, both of which are patented to the appellant by separate patents. One device is known as the tenon and groove. Upon further consideration, the appellant will not press any claim

predicated upon this patent, but will confine his claims to the other.

The other invention is secured by Letters Patent No. 67,046, dated July 23, 1867 (p. 866).

The two suits have been prepared together, and are to be argued together, and by stipulation of counsel (Record, p. 11), the proof taken in either case is to be considered in both.

The invention secured by Patent No. 67,046 is for an improved method of making burglar-proof safes, and the patent states the nature of it, thus :

"The nature of this invention consists * * * * *in securing a series of plates forming a casing or door of the safe by means of conical or tapering arbors,* which being tapped in from the outside of the door or casing, and keyed upon the inside, present serious obstacles to the removal of successive plates forming the body of the safes" (Record, p. 866).

* * * * * * * *

"In order to still further secure together the plates forming the door of the safe, I use a conical arbor, 1, or a number, if necessary; they are introduced in openings through the series of plates, being tapped into the two innermost of all of the plates, and keyed in position. A smooth surface in the plane of the outer face of the door is presented, giving no means of removing the arbors 1, even should the key 2 be removed.

* * * * * * * *

"Since the doors of safes are more exposed than any other part of them, it is necessary to embody in their construction such devices which in themselves are the simplest as shall effectually bar forcible entrance to the safes. The introduction of arbors for the purpose of more effectually binding in one compact mass the series of alternate iron and steel plates in the doors or bodies of safes, will very much protract the labors of the burglar; indeed, it will be necessary, in order to remove one sheet in succession, to cut out the arbors, which are made of the hardest steel. The arbors may be tapped through the entire series of plates, and the inner end rivet-headed, instead of keyed, as shown in the drawing, or the inner plate, as well as other in the series of plates, may be put together in sections, and, fitting into notches in the arbor

or arbors, secure them in position. In this latter construction the arbors need not be conical, but may have any cross-section, tapering longitudinally" (Record, p. 867).

In the "tenon and groove" patent, dated the same day as this, the bolts are further described, but not claimed:

"The arbors *D* are conical in form; they are tapped through the series of plates composing the door and casing of the safe, to add security thereto; they are keyed from the inside, or are otherwise secured to prevent their removal from the outside, where the smooth surface is presented flush with the outside surface of the safe" (Record, p. 864).

The bill averred infringement, and prayed for an injunction and an account.

The defenses were:

1. Hall was not the inventor.
2. Non-utility.
3. Non-infringement.
4. Anticipatory patents and publications.
5. Want of novelty.
6. Anticipatory knowledge and uses.
7. Abandonment.
8. Sundry averments as to M. A. Dalton.

The case came on to be heard in the court below upon these issues, and upon the hearing, the court decreed that the bill should be dismissed in both cases, to which decree the complainant then excepted, and prayed an appeal to this court, which was duly allowed, and the appeal was duly perfected. (Record, p. 970).

Assignment of Errors.

1. The court erred in each case in dismissing the bill so far as each related to Letters Patent No. 67,046.

2. The court erred in admitting in evidence the patent of McNeale & Dodds.

The bill was dismissed by his Honor Judge Baxter immediately after the case was orally presented to him, without delivering any opinion on the subject. We, therefore, do not know, excepting from his remarks from the bench, upon what ground the decision was reached; and these remarks are not of record.

THE ARGUMENT.

1. As to M. A. Dalton.

The averments in the bill as to M. A. Dalton are of such an unusual character that they require to be examined and explained instantly.

The answer avers that there was a prior suit brought against the present respondents and others by Hall for these infringements, which he dismissed without prejudice; that the copies of the papers in "that suit are lost, *i. e.*, that they can not be found;" that these papers included testimony taken by respondents to prove earlier uses of Hall's devices; and that after Hall dismissed his suit he employed Dalton to travel through the country, representing himself as the agent of bankers, and engaged in getting up a book upon burglar-proof safe making; that he thus succeeded in inducing nearly all the safe makers in the country to sign or swear to statements manipulated for preservation by Hall, which statements were not understood by the parties making them; that Dalton promised that such statements were to be published in book form, but they were not so published, but are kept by Hall for the purpose of intimidating such parties, and to prevent them "from testifying."

The facts as to all this, as given in the uncontradicted testimony of Mr. Dalton (pages 647 to 662, inclusive), are as follows:

Mr. Hall had suits pending against these parties, which were dismissed without prejudice. The counsel of Mr. Hall at that time were Hon. J. D. Cox, ex-Secretary of the Interior; Gen. H. L. Burnett, now of New York, and Hon. J. F. Follett, member of Congress elect from the First District of Ohio; and it was by their advice such action was taken. Prior to the dismissal, however, by the instruction of Gov. Cox, Mr. Dalton made accurate copies of all the depositions of witnesses taken on behalf of the respondents, and accurate copies of all drawings, and other exhibits in the case filed by them (Dalton, pp. 647-656). Mr. Dalton then traveled for over a year throughout the United States and in the principal countries of Europe, and procured the affidavits of the leading safe manufacturers and their best workmen, in which were described the *modus operandi* of safe making by each, and in which the date was given of the first knowledge and use by them respectively of the conical bolt, with a figure of the bolt attached (Dalton, p. 651). Of the hundred and more such affidavits, all but one or two at most declare such knowledge and use to have been in the latter part of 1867, or the beginning of 1868.

Mr. Dalton procured these affidavits upon the representation that he was gathering material for a book to be published, which was to be a history of the art of safe making, showing its progress from the earliest to the latest date. He did not disclose his connection with Hall. Saving this suppression, he concealed nothing. The affidavits were freely given, and every statement of the affiants was reduced to writing, and carefully read, and the drawings compared before being verified. This book was subsequently published, as Mr. Dalton had promised. A copy of it is in evidence (Record, pp. 712 to 862, inclusive). Dalton (Record, p. 651).

It appearing, by the affidavits of the appellees, and of the principal witnesses who had testified previously in their behalf that their former statements in their depositions as to their knowledge and the date of the first uses of the conical bolt were entirely inconsistent with the later ones, Hall began the present suits, and was met by the insinuations in the answer as to Dalton. No proof whatever has been taken by the appellees to sustain any averments thereof; and on the contrary, the record incidentally shows them incapable of proof, and shows most of them to be untrue.

So far as depriving the respondents of testimony is concerned, there is not even an intimation to that effect in the proof. Every witness, so far as known, who testified for them before, has testified for them now. Every exhibit offered before is offered now, and others, *e. g.*, the Cooper reamer, Weimar bolt, Butler dies, Mossman books and bolts, not offered before, are now in the case.

The only exception is the original Butler drawing of the "Red Burglar Safe," but a copy of this, authenticated by Mr. Butler, was put in by the complainant himself, against the objection of the respondent (Record, pp. 137 and 138).

So far as the affidavits are concerned, every witness, except Mossman and Cady, testifies to their understanding of them.

Mossman is proven not only to have understood his, but to have prepared the materials, examined the books and summoned Kohout, Bolstetter and Breaky from the bench to the office, as his best workmen, in order to make it accurate.

Kohout (Record, pp. 316, 317, 318).

Cady is contradicted in every statement he makes regarding his by the notary who took it and Mr. Dalton.

Forbes (Record, pp. 425, 426).
Dalton (Record, p. 653).

Berkmeyer, who attempts to gainsay his, is contradicted by the respondent, Herman Urban, who also joined in the affidavit, and who swore that he knew the same to be true and correct.

Urban Affidavit (Record, p. 686).

Mr. Urban was not called as a witness. Why?

F. Naeher, a partner of Mosler, Bahman & Co., the other respondents, also gave his affidavit to Mr. Dalton, and Mr. G. Mosler appended his affidavit, in which he said the statements of Naeher were "true and correct."

Naeher and Mosler Affidavits (Record, pp. 868–873).

Mr. Mosler was not called as a witness. Why?

So far as the loss of the papers is concerned, not a particle of proof as to their loss, or their absence or presence in the clerk's office, has been taken.

So far as the book is concerned, we offered it in evidence during Mr. Dalton's deposition to show, among other things, that it was published, and when Mr. Dalton finished his deposition-in-chief, in which he identified the book, stating fully his whole connection with it, in order to refute the imputations upon him and upon the case, the respondents' counsel, before cross-examining, "objected to the whole and every part of the foregoing examination and deposition as being" * * * * * * * (among other objections) "a palpable effort to dirty up and confuse the record" (Record, p. 665).

So far as Mr. Dalton is concerned, Butler and others testify to his entire correctness of deportment and accuracy of preparation. It is admitted by us that he procured the affidavits in Hall's interest, and did not disclose that interest. To have done so would have been fatal to his purpose. But beyond that harmless suppression, not one instance of prevarication, misstatement or departure from the strictest rectitude is proved against him. He stands entirely free from any taint, and deserves the most ample absolution from the imputations which the record contains.

Butler (Record, 147, 148).
Forbes (Record, 426, 427).

It is but simple justice to the gentlemen who were of counsel in the former suit, to say that they forbore moving to strike the whole averment from the answer, only because they desired the closest scrutiny as to the alleged loss of the papers, and the utmost publicity as to the acts and statements of Mr. Dalton.

The counsel who represent the complainant now feel, however, that these motives, although praiseworthy, should not have prevailed, but that the averments, instead of resting upon vague insinuations, should have been made to take such definite form as that they might be denominated *charges*, and met as such; or else that the whole matter should have been stricken out as scandalous and impertinent.

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2.—The Infringements.

The Infringement by McNeale & Urban.

McNeale & Urban admit that at and prior to the time of the finding of the bill herein, and after the issue of the aforesaid patents, they made and sold safes, in the construction of which bolts were used for fastening together the different plates of metal of which such safes were composed; which said bolts were constructed and secured in said plates substantially as shown in the model marked Exhibits B, C, D and E, J. L. Hall.

Stipulation (Record, p. 11).

Also, that said bolts B and C, J. L. Hall, are constructed of steel and iron welded together.

Stipulation, 1404 (Original Record).

Letters D and E, in above stipulation, stricken out, having been inserted by mistake.

Stipulation, 1404 (Original Record).

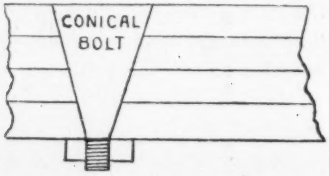
Frank Millward, an expert, called by the complainant, after fully describing the identity of the bolts admitted to be used with those described in the patent, says :

" The use of these bolts is in effect precisely what is prescribed in said Patent 67,046."

Millward (Record, p. 15).

George Berkmeyer, foreman for McNeale & Urban, gave Dalton his affidavit, in which he says :

" These " (*i. e.*, conical bolts like the exhibits in the stipulation) " we arrange in our safes," * * * * * as shown in three drawings made by him."



" No. 1 shows the conical bolt as it is when passing clear

through the plates of the safe. * * * * * These conical bolts are made drill proof" (Record, p. 683).

Herman Urban gave his affidavit to Dalton, in which he says :

" I have heard read and carefully examined all that our foreman, George Berkmeyer, has sworn regarding safes and the various improvements therein, and I know the same to be true and correct. * * * * I was present when our foreman, George Berkmeyer, gave his statements hereto attached, and as before said, I know he has told them truly and correctly, and without any influence or interference on my part" (Record, p. 686).

As before stated, Mr. Urban was not called as a witness in his own behalf, nor was his partner, McNeale.

Berkmeyer was called for the respondent, but not examined on this point, and the use of the bolt in combination by these respondents was not denied by counsel in argument below.

Infringement by Mosler, Bahman & Co.

Mosler, Bahman & Co. do not, of record, admit the use of the bolts; but on February 19, 1873, F. Naeher, at that time a member of the firm, and John Mosler, then the senior member of the firm, made their affidavits for M. A. Dalton, which affidavits are identified by Dalton, and offered in evidence.

Dalton (Record, p. 654).

" These are their signatures, * * * and they were fully informed of the contents * * * before they signed them."

Dalton (Record, 1348).

The affidavits are printed (Record, pp. 868 and 873).

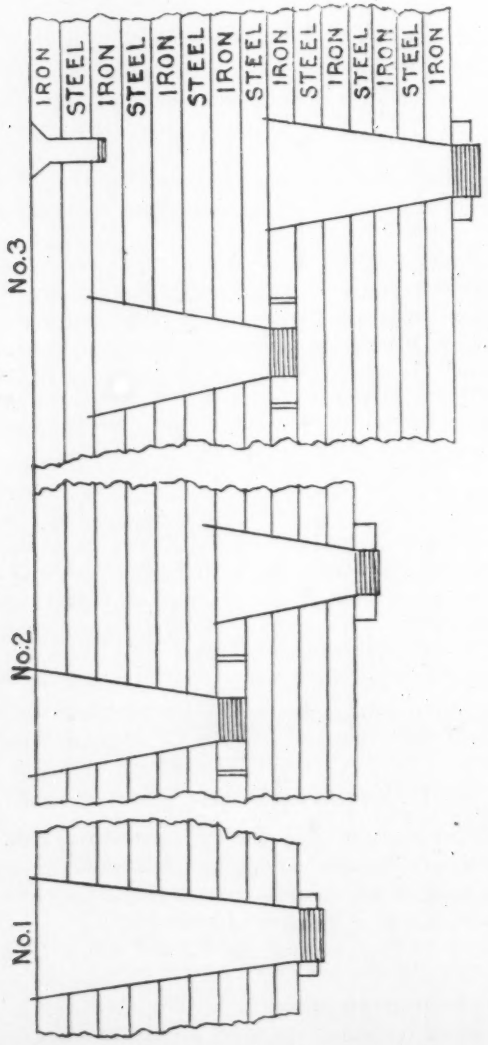
" They either showed me specimens of work, or made the drawings themselves, or both. I think they represented to me, at the time, that they were using conical bolts."

Dalton (Record, pp. 659 and 660).

Extract from the affidavit :

" We began the use of the taper or conical bolt—which was

first used between four and five years ago—in the year 1868; and it is shown in the annexed drawing.



We employ it now to hold the different plates of metal together and to fasten our bolt-frames securely to the doors" (Record, p. 870).

The accompanying drawing shows a conical bolt, the use of which in combination, as in the other case, Millward had said, "is in effect precisely what is prescribed in said Patent 67,046."

3. The Court Erred in Dismissing the Bills.

The verbal intimation of his Honor Judge Baxter was that no patentable novelty was shown in the invention.

We think that this was a clear misconception of the invention, and that a succinct statement will make the misconception plain.

Two kinds of iron safes are distinctively well known, serving different purposes. One of these, which is the most common, is a "*fire-proof safe*," composed substantially of a thick wall of some non-conducting substance, confined between an outside and inside sheet of iron. This kind of a safe offers no substantial resistance to an expert burglar, but can be opened in a few minutes.

The other kind of safe is what is commonly called the "burglar-proof safe," by which is meant a safe which is capable of resisting the attack of the most skillful workmen with the best tools, for a longer time than a burglar can ever have for his operations. Of course, time enough being given, a hole can be made through anything. But the burglar-proof safe as now made, cannot be opened under the most favorable circumstances in less than a week; and, therefore, it is practically burglar proof.

This kind of a safe has walls of layers or sheets, composed of mixed iron and steel, which are now made of metal so tough that they cannot be fractured by blows, and so hard that they cannot be drilled by tools, except so slowly that no burglar can ever have time enough to perform the operation.

From the nature of their construction, these layers, or laminæ, must be in some way bolted together so as to become

practically a solid mass. If they are not, they may be forcibly separated. When, however, they are bolted together, they necessarily have holes through them for the insertion of the bolts; and this circumstance is an element of weakness, because the bolts may be drilled out, or broken off by means which will presently be described, or unscrewed from the outside, leaving an entrance into the safe; and whenever the burglar can find a hole, however small, to the interior of the safe, he can introduce through it gunpowder, and by an explosion, which expends its force upon the safe itself, break the fastenings, and by that means obtain access to the safe.

The problem, therefore, has always been to so combine plates and bolts that when the wall is built up it will be practically as strong in one place as in another, and no advantage can be taken of the circumstance that it is composed of layers.

The invention contained in Hall's Patent No. 67,046, July 23, 1867 (page 866), solves this problem. It is substantially for a method of making a burglar-proof wall for a safe; and it is claimed as a combination in the 3d claim of that patent in these words (page 868):

> "3. The conical or tapering arbors 1, in combination
> "with two or more plates of metal in the doors and cas-
> "ings of safes and other secure receptacles, the arbors
> "being secured in place in the plates by keys 2, or in
> "other substantial manner."

The combination is shown in Fig. 3 of the drawing, where it appears better expressed than it can be by words; assuming, however, that the plates of metal and the bolts are of drill-proof metal. It is apparent from the drawing that after the plates of metal have been set up together, face to face, a conical hole is made through them, having its base on the outside, and tapering towards the inside, and that a conical bolt, of the same shape as the hole, is fitted into the hole, having a screw thread cut upon its smaller end, whereby it is secured from being drawn out endwise; and having a key seat cut parallel to its axis at its inner end, into which a key is driven, preventing the bolt from being turned on its axis and thereby unscrewed. The specification points out that the bolts "may

" be tapped (*i. e.* screw cut) through the entire series of plates."

The conditions exhibited are a conical hole, conical through the entire series of plates to be secured, a conical bolt corresponding thereto, and " secured in place in the plates by keys " or any other substantial manner;" and this is the invention.

That it solves the problem effectually is not seriously disputed in this case. That any other method of constructing a safe-wall, known before the invention of Hall, is insecure, is abundantly established, and substantially uncontradicted.

At the first glance the difference between this method of construction and those unsafe methods which antedated it, does not appear to be very decided, and it is necessary to examine the physics of the case and comprehend the reasoning upon which the invention is founded before the great difference in results can be understood. The old method was by the use of a cylindrical bolt, with a conical head reaching a part way through the safe-wall and the nut on the inside to draw the plates together by a strain which is resisted by by the conical head. Such an arrangement serves two purposes, one of which is to press the plates together, and the other to hold them in their position. To the eye of the ordinary mechanic such a combination, if the elements were drill proof, was as good as could be desired. But to the mind of the inventor a safe so constructed was very unsafe, and in fact is very easily opened by the burglar. Now that its defects are remedied and pointed out by the inventor, they are very apparent.

A fine wedge, driven in between the conical head and its seat at the outside of the safe, will certainly and with a small expenditure of force break the conical head off at the line where it joins the cylindrical part of the bolt.

The reason is, first, that the cylindrical part of the bolt is firmly held in the body of the wall so that it cannot yield sidewise to the lateral force exerted by the wedge, whereas, the conical head can yield sidewise up the inclined plane formed by its construction, and as a consequence the bolt breaks at the junction of the cylinder and cone. The cylindrical part also being drawn inward by the nut, separates all the easier from the conical part in consequence of the strain. When the

head is broken off, then a punch will drive the cylindrical part inward and the safe is practically open.

Another method of fracturing these bolts is by striking them squarely on their heads with a hammer.

The conical seat holds the head so that it cannot yield to the blow without spreading sidewise the steel plates which contain it. The cylindrical part, however, has no such support, and the force of the blow operating upon the molecules is transferred through the conical head to the cylindrical part, where it tends to carry the cylinder away from the cone, and the result is that a few blows will drive the cylinder off at the same line where the wedge, when it is used, will separate them.

To remedy these defects in the object of the invention, and that is accomplished by the combination shown in the drawing and described in the specification. In place of a bolt with a head upon it, as in the former case, a frustum of a cone is used, conical through the entire mass to be secured; the plates are squeezed together by other means than by drawing them with the bolts, and the cone is then inserted and screwed in as shown in the drawing. If nothing more were done it would be liable to be unscrewed from the outside, and therefore it must be fastened so that it cannot be turned on its axis. For that purpose a key is used, as shown in the drawing, or a screw blade may be attached to the inner end of the frustum, and a nut put on to it there inside of the safe, or it may be riveted over in the inner plate of the safe. In such a combination this fastening cannot be got out by the burglar. If he tries a wedge, the entire length of the cone in the wall of the safe receives the strain in one straight section, and the cone cannot be broken in two. If he uses a hammer, the entire depth of the cone receives the blow, and there is no place in the wall of the safe where there is any tendency to break, because the cone is supported from end to end in the solid wall against the blow of the hammer. If a nut is used on the inside of the safe to prevent the bolt being turned on its axis from the outside, no lateral strain can be imposed on the nut section, because it is inside of the wall of the safe, and is not laterally rigidly supported. The result is that such a combination is burglar proof, and the object has been accomplished.

The principle of action which characterizes this combina-

tion is entirely different from that which is found in the other. The weak point in the old construction is eliminated, and thereby a new invention is made. The difference between the two is not a difference of degree, but of kind, whether that difference be considered in reference to the geometrical construction alone, whichis of no consequence in itself, or in reference to the physical conditions which result from the difference in geometrical construction, which is of vital consequence. Considered geometrically and in reference to one element of the combination, a cone and cylinder united together are entirely different from a frustum of a cone, but if no consequences ensued from that difference it would be of no importance.

When, however, the one form in combination makes an impregnable safe, and the other affords no security, then the difference is essential, and the discovery of the defects in the one, and the capacities of the other form, and the application of that discovery to the practical result, constitutes patentable invention.

The necessity for this invention, and the value of it, becomes more and more apparent when the history of safe making is known; and when the various difficulties which beset the manufacturer, and the practices of the burglar which have just above been glanced at, are stated more in detail.

History of Safe Making.

The burglar-proof safe of to-day, with its almost irresistible defenses was totally unknown in the early history of safe making.

The primitive burglar-proof safe was a "strong box," being nothing, more than an oaken chest. Then came an iron box, made of one plate of soft iron, with a great display of strap hinges and fanciful carving. It was thought, for a time, to be impregnable, but, as was said by an expert, *dehors* the record, "A modern burglar would have gone through it with a tooth-pick." This was followed by the fire-proof safe, with its walls filled with non-inflammable substances, made, after a time, a little heavier in metal, to give greater security against burglars, but yet distinctively designed for protection against fire. This was supplemented by a safe without fire-resisting capacity, being wholly designed to be burglar proof, and for that pur-

pose made still heavier in metal, and locked by locks which had come to be greatly improved. In these safes, bolts of different shapes were used, being varied from time to time. These were countersunk bolts, parallel bolts, and many others hereafter to be considered.

But they were all unavailing against the burglar. The same progress in art which taught the maker how to make them taught him how to evade them, and it came to be, and still is, only a question of achievement, on the one hand, and counter achievement on the other, with but little space of time between them.

If the safe was made of plates of metals the burglar drilled through them, if the metal was soft enough for the drill. If it was too hard for the drill, it was brittle, and then he crushed it with a sledge. If it was made with bolts, which were straight all the way through without a head, he drove them in. If the bolt was a bolt, part head and part shank, being the cylindrical bolt before referred to, he cut off the head first, and then drove in the shank. If this would take too much time or labor, he drilled around the bolts in one plate, and crushed around them in the next, until he lifted them out, and then he removed each plate successively.

If there were too many bolts to be thus disposed of, he "stripped" the safe by forcing the plates off exteriorly over the heads of the bolts, or strained the latter until they broke. This was not all. The quality of the metal often proved as insufficient as the bolts.

Various metals were employed, from time to time, by different manufacturers, to prevent drilling.

Of the safe makers named in this record, Lillie's Safe and Iron Company used chilled iron, and sometimes hardened steel rods—sometimes Tennessee iron. Herring used what was known to the trade as Franklinite, or *spiegel eisen*, which was very hard, impervious to the drill, but very brittle and easily broken. Cornell & Cady used chilled iron (Franklinite), which was poured in between the outside and inside plates while molten, and chilled in the process of cooling. Hendrickson used an outer and inner casing of boiler-plate iron, secured together by rivets, having a space between them, which was filled by coils of Ulster iron, over all which was poured molten iron, to fill the spaces and make a solid mass.

The majority of makers, however, before 1866, used plates of steel in alternation with plates of wrought iron.

In July, 1866, Mr. Terwilliger got a patent covering welded iron and steel, the material and mode of making which had been unknown in this country to that time, and in 1867 most manufacturers began the use of it, which use is generally continued until the present day.

Welded steel and iron is composed of a series of alternate plates of steel and iron, which are welded together, making one solid plate, which combine the drill-proof qualities of the steel and the strength and malleability of the iron.

Having such a valuable metal provided for them, the remaining problem for manufacturers was to secure the plates by fastenings of equal strength with the plates themselves. Rivets and screws of soft iron had been commonly used, the use of soft iron being necessary to permit riveting, or cutting the thread on the screw. The trouble was that such rivets and screws could be readily drilled and removed. To prevent this, a new step was taken. This was to insert in the outer end of such rivets and screws a steel plug, which was then welded to the iron, and then hardened to resist the drill.

But still, these fastenings were found inadequate to resist opening the safes by the process known as "stripping," which is simply this—the burglar, by tapping a hole through the outside plate, near one of the sides, puts in a set screw of greater power than the rivets, which are, of necessity, small, and, by turning this screw, breaks off the rivets and raises the edge of the plate to admit of the insertion of a jimmy or crow-bar, when the remainder of the plate is rapidly stripped off. The steel plates thus exposed are easily removed, either by breaking or loosening the fastenings connecting them with the iron plates.

Sometimes, instead of one large screw, several smaller ones are employed, with adjuncts, known as "lifting-jacks," "screw-arches," etc., but the principle of all is the same, *i. e.*, to strip one plate from another by lifting its center or end until it breaks its fastenings and can be taken off. It, therefore, became most essential to have some method whereby to fasten the plates together in such manner that they could not be stripped off, but should be held by a bolt, which, from its

form, could neither be driven into the inside nor be beheaded from the outside. There was no such method known up to July, 1867. The countersunk bolt, until then, had been the best form used, but it is not a conical bolt, nor the equivalent of a conical bolt, in form or function.

Upon the intrinsic difference between a conical bolt and a countersunk bolt, in combination with their plates, conceding the countersunk to include all the desultory forms of bolts previously used, this case depends. There is, in fact, no other question in it, and to decide that question there must be a fixed and accurate understanding of these differences, and of the uses to be subserved and the functions to be performed by each bolt.

Every bolt, in a burglar-proof safe, must be considered and compared in conjunction with the plates through which it passes, and which it is intended to secure. This is evident at once upon reflecting that the utility of any bolt used in a burglar-proof safe depends upon its ability to hold the plates of such safe together, to resist and thwart every attempt of the burglar.

A bolt away from its plates is like a key away from its lock. Its service depends upon their joint presence and co-operation, but still, like the key, each bolt has form and function which may be separately defined. A conical bolt is the frustum of a cone. It is one which tapers with an unbroken line throughout all the plates which it is intended to secure.

A countersunk head-bolt, *per contra*, is a bolt having always a head and a tail, *i. e*, a cone shaped head upon one end, and a cylinder or shank upon the other, the angle or point of junction of which always occurs within the body of the plates which such bolt is intended to secure.

This angle is a defect which renders it wholly valueless as a means of securing the walls of a burglar-proof safe. Because whenever such an angle occurs, the bolt can invariably be broken in two from without by blows upon its head, and the fracture must inevitably occur at this angle. The reason for this has been fully given.

It therefore follows, that under all circumstances, without any exception, if a bolt is one unbroken frustum of a cone, with the outer plate, which it is intended to hold, as the base, and the inner plate, which it is intended to hold, as the plane parallel to its base, that bolt is a conical bolt.

If, however, a bolt has a conical shaped head, with a cylinder appendix, and their angle of junction is found at any point within the extreme plates it is intended to hold, that bolt is a countersunk headed bolt, *i. e.*, a bolt with a head which is seated in a countersunk space reamed out to receive it.

This difference marks every form of bolt which is intermediate between the two, and affords an unerring criterion by which the character of each may at once be determined.

The record shows the use of various bolts with various degrees of conicality to their countersunk heads, some with greater or less length of cylinder, some with greater or less angle to the head, which are claimed by the respondents to be conical bolts, but if the test is applied by asking if they present an unbroken conical surface through all the plates they are intended to secure, without any length of cylinder whatever, or any angle of junction occurring within such plates, it is at once seen that they are not conical bolts.

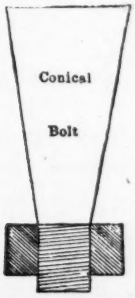
As has been stated before, however, this distinction can only be ascertained by looking at the bolts as they appear when seated in the plates. They are nothing without their surroundings.

The patent expressly contemplates this, claiming "the conical or tapering arbors *in combination* with two or more plates of metal."

All this can be illustrated by the following cuts:

No. 1 s a conical bolt, apart from its plates.

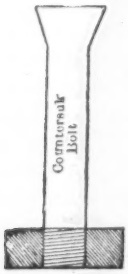
No. 1.



"Betteley Sketch No. 1."
Record, page 371.

No. 2 is a countersunk head-bolt, apart from its plates.

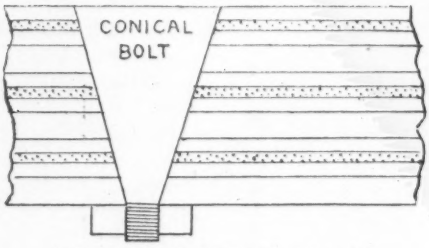
No. 2.



"Betteley Sketch,
No. 1."
Record, page 371.

No. 3 is a conical bolt seated within six plates of a safe, which it is intended to secure, and fastened by a nut on the interior. The alternate plates are welded iron and steel.

No. 3.

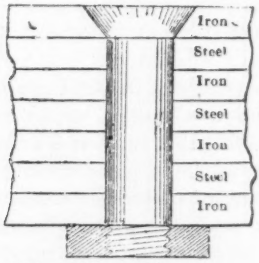


"Hendrickson Sketch." Record, p. 402.

It will be observed at once that this bolt is conical to all the plates through which it passes.

No. 4 is a countersunk head bolt seated within seven plates, which it is intended to secure, and fastened by a nut on the interior.

No. 4.



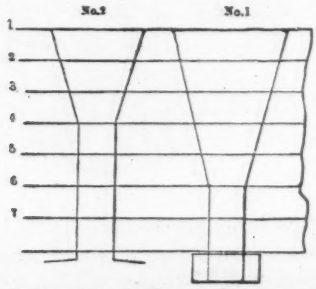
Kohout Sketch, No. 4."
Record, page 326.

It will be observed at once that this bolt is not conical to all of the plates through which it passes. It is conical only to the first plate, having a cylinder length through the remaining six plates, with the angle of the junction of head and cylinder within the plates.

No. 5 shows other forms of countersunk head bolts, with their heads made more or less conical, passing through a different number of plates.

But the same difference will be noted. The bolts are not conical throughout the length of plates, but they do have an angle within such plates.

No. 5.



"Kohout Sketch, No. 1. Figs. 1 & 2."
Record, page 324.

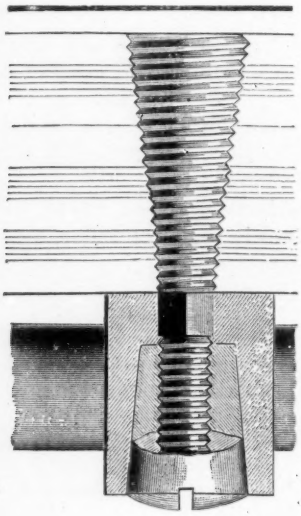
These unerring tests, when fully comprehended, indicate at once to the practiced eye the identity of bolts, wholly regardless of any attempt at deceit by lengthening or swelling the head, or increasing the conical shape.

No. 6 shows another bolt, which, as shown seated in its plates, is purely a conical bolt, but which requires a word of explanation.

Viewed separate and apart from its plates, and without considering its relation to them, it might be supposed to be a countersunk bolt, as it has a head and a shank.

It is purely a conical bolt, however, with its conical shape preserved through all the plates of the safe which it is intended to secure, but with a cylinder passing beyond the plates into the interior of the safe for subsidiary uses, such as affixing a nut, carrying a frame bar, etc.

No. 6.



The outside plate is simply a veneer plate to permit decoration, &c. It is not a burglar-proof plate, and hence the bolt does not pass through it, or secure it.

It must be again repeated that the conical bolt never, under

any circumstances, has any appreciable cylinder within the plates of the safe. Whenever these subsidiary uses occur, they occur wholly as a superaddition to the plates which are relied upon for burglar protection.

They do not in anywise appertain to the burglar-resisting quality. Such uses are strictly uses of convenience after the resisting function has been performed. It could not be, in the very nature of the thing, that the conical bolt should have any length of cylinder whatever within its plates, for that would cause an angle at the point of junction between the cone and the cylinder, and that would be, instantly and always, fatal to the great merits which distinguish it from every other known bolt. It is quite apparent that the bolt in No. 6 exercises its whole power of resistance to the burglar by securing the wall of the safe it is designed to secure. It is further apparent that the stem or cylinder neither adds to nor detracts from its resisting capacity, being employed wholly for another purpose, viz., to hold the bars in the bolt frame.

And further, it is equally apparent that if the plates be taken away from this bolt, and if it be considered in the abstract solely as a matter of geometrical form, it has the precise shape of a countersunk head-bolt.

The countersunk bolt, likewise, may have its cylinder prolonged beyond the plates, into the interior of the safe, for subsidiary uses. As in the case with the conical bolt, that would not affect its character. But it would still be a countersunk bolt because, within the body of the plates it was intended to secure, there occured the angle of junction between its head and shank. So it may occur that, apart from its plates, and viewed only as to shape, without regard to combination with the plates, a conical bolt and a countersunk bolt may have the same outlines, although they never can perform the same functions.

All this is very simple. And yet, when once understood, its great simplicity becomes its strongest recommendation.

As was said by Story, *J.*, in Ryan *v.* Goodwin, 3 Sumn., 514 :

"The combination is apparently very simple, but the simplicity of an invention, so far from being an objection to it. may constitute its great excellence and value. Indeed, to produce a great result by very simple means, before unknown or unthought of, is not unfrequently the peculiar characteristic of the very highest class of minds."

And in Wyeth *v.* Stone, 1 Story, 273, the invention was an exceedingly simple machine for cutting ice, and was ridiculed for its simplicity. The court sustained it, nevertheless, as producing new and very beneficial results.

History of the Invention.

The complainant invented and used conical bolts in combination with the plates of a burglar-proof safe, as early as 1858 or 1859.

Hall, Record, 23.

The first bolts used were smooth, and had no thread cut upon them. They were passed through the series of plates composing the doors of the safe, and riveted down in a hole countersunk on the inside of the inner plate.

Hall, Record, 27, 592, 593.

They were all steel (Hall, 1226), and were put in two safes made at that time for exhibition at a State fair and the United States fair held in 1860. These safes were afterward sold, one to Moses Fowler, in Lafayette, Indiana, and one to the treasurer of Loraine County, Ohio.

Hall, Record, 28, 29, 600.

The use was an experiment, to test what security would be afforded against burglars or experts who might attempt to open the safe.

Hall, Record, 28, 29, 41, 42, 600.

The nature of the invention was such that until some such attempt was made, no opinion could be formed as to the value of it.

Hall did not then regard the bolts as perfect for the purpose for which they were designed, *i. e.*, to hold the plates together, because having no thread upon them fitting into corresponding threads on the walls of the safe, and being riveted down on the inside end when put in position, they had a tendency to squeeze the plates together, and to throw a strain upon the bolts and their inside fastening.

Hall, Record, 28, 593, 600.

Notwithstanding which, he says: "I felt somewhat satisfied in my own mind that I had a stronger and more secure made safe than any other then offered for sale by any other manufacturer."

Hall, Record, 42.

But he made no further use of the bolts until 1865.

Hall, Record, 28, Q. 25; 41, Q. 89; 43, Q. 99.

He was deterred because of his limited capital, his business relations, and the non-demand for that class of work.

Hall, Record, 25, Q. 12.

In 1867 he was informed that welded iron and steel plates were being made and sold in this country. He had heard, in 1855, that they were made in England, and had then been shown a specimen. He procured some of the plates in 1867, and saw that they were superior to the metal then employed. Upon July 23, 1867, having perfected his invention, he received his patent for it.

Hall, Record, 44, 45, 592, 593–597, 184, Q. 127.

It is hardly necessary to say that his delay in applying for a patent is no presumption of abandonment.

"Forbearance to apply for a patent * * * until the party has perfected his invention, and tested its value by practical experiment, affords no presumption of abandonment."

Agawam Co. *v.* Jordan, 7 Wall., 583.

Characteristics of the Conical Bolt as Part of the Combination.

1. A conical bolt, to be used in a burglar-proof safe, is one which is tapering in form, solid in construction, and which presents its taper in an accurate fit to all the plates of the safe through which it passes, and which it is intended to secure.

See Drawings and Specifications of the Patent 67,046, p. 866.

"It must have a continuous taper through all the plates of the wall depended upon to resist burglars."

Millward, Record, 620.

"A conical bolt is not a composite structure of shank and head, but it is a simple frustum of a cone."

Millward, Record, 621.

The conical bolt "is a simple composition—the frustum of a cone."

Waterhouse, Record, 460.

"The cone bolt has but one element—the cone."

Wadman, Record, 521.

2. It cannot act as a *draw bolt* in a safe to draw the plates together so as to shorten the distance between them.

"It cannot [perform the office of a draw bolt] * * * It performs but one function—that is fixes each plate in its relative position."

Waterhouse, Record, p. 462, see also pp. 469, 470.
White, Record, p. 550.

"It is, therefore, easy to see that the conical bolt simply takes the place of the tap which made the threads in the hole, and when in, simply acts to preserve the relation between the layers of plates * * * and that the conical bolt has no power whatever to draw the plates together or otherwise change that relation."

Millward, Record, 612, Q. 18.

"The conical bolt *will not draw plates together*, but merely holds them in the position in which they were reamed and tapped.'

Corry, Record, 555, Q. 12.

"Hall appears to have been the first to abandon the *draw-bolt* principle of operation, and to draw his plates together by temporary means, while making the holes, and, in place of the permanent *draw-bolts*, to use conical dowel-pins, as it were, which do not, nor can not, operate to draw the plates together, but simply operate to hold the plates in proper position."

Millward, Record, 611, Q. 16.

3. Conical bolts of welded iron and steel can be practically threaded and seated in suitably threaded iron or welded iron and steel plates, and when so seated make a more secure, safe wall than can be made by the use of plain conical bolts.

Corry, Record, 10, p. 555; 16 and 19, p. 555; 36, p. 557; 43, 44 and 45, p. 558; 46, p. 559; 53, pp. 560 and 561.
Hall, Record, 113, p. 46; 143, pp. 187 and 188; 150, p. 189; 43, p. 597.
Millward, Record, 39, p. 620; 49, p. 626.
Woolley, Record, 61, p. 436.
Monig, Record, 23, 24 and 25, pp. 504 and 505.
Klare, Record, p. 494.
Waterhouse, Record, 16, p. 462; 4 and 5, p. 459.
White, Record, 126, p. 548.
Wadman, Record, 9, p. 518; 27 and 28, p. 521; 59, p. 524.

Characteristics of the Countersunk Bolt.

1. A countersunk bolt consists of two dissimilar parts, viz., a head and a cylinder.

"A countersunk bolt is composed of two parts—a shank and a head; or, in other words, a cylinder and a frustum of a cone connected."

Millward, Record, 621, Q. 40.

"A countersunk bolt is necessarily composed of *two members*, a head and a shank."

Millward, Record, 622, Q. 42.

"The term countersunk bolt, meaning one a portion of whose length is included in the plates to be fastened, is cylindrical."

Knight, Record, 292, Q. 172.

"They are, from a geometrical standpoint, of a double composition—that is, a cylinder combined with a frustum of a cone."

Waterhouse, Record, 459, Q. 9.

"The conical-headed bolt (*i. e.*, countersunk) consists of two elements, a cone and a cylinder."

Wadman, Record, 521, Q. 29.

"Any headed bolt, whose head enters to a greater or less extent, and fits a corresponding or counter cavity in the object, is a countersunk bolt for the time being, and this whatever shape its *head* may be."

Knight, Record, 290, Q. 163.

2. The countersunk bolt is a draw-bolt.

"The old countersunk head-bolt simply *draws* one or two plates."

Cooper, Record, 158, Q. 42.

"A countersunk head-bolt is a *draw-bolt*."

Hemler, Record, 231, Q. 138.

"The original purpose of * * * would be that of a *draw-bolt*, or a bolt wherein the cylindrical part is used as the principal element, and the head and nut as auxiliary elements to perform the purpose of *drawing* the two extremes together."

Waterhouse, Record, 460, Q. 9.

"In my use of cone-headed or countersunk bolts, they have been invariably used for *draw-bolts*."

White, Record, 533, Q. 22.

"Every countersunk head-bolt is a draw-bolt."

Corry, Record, 587, Q. 221.

"The countersunk bolts are put in to bring the plates together."

Corry, Record, 587, Q. 227.

"These bolts (*i. e.*, countersunk) are the same in effect as ordinary straight *draw-bolts.*"

Millward, Record, 621, Q. 40.

3. The angle of junction between the cylinder and the head of the countersunk bolt is its point of weakness, and, therefore, limits its power of security.

When a countersunk bolt is seated in its plates, and blows are applied exteriorly, the conical head rebounds outward after each blow, upon the same principle precisely as a bung starts out of a barrel. It leaps upward and outward, and is held back by the cylinder, which is impelled in the other direction. If the blows are continued long enough, a break between them must occur, and it always occurs at the neck or angle of the bolt. If, on the other hand, the cape chisel is applied at the outer edge of the conical head, the head rebounds similarly as in the pounding, but in this instance the cylinder remains entirely at rest and holds the head with an unyielding grip, precisely as the cylinder of a ground glass stopper is held in the mouth of a bottle. As the cape chisel continues to be struck, the head continues to rebound, not only outward but toward the side opposite the blow. The result is, that as there is no *give* to the cylinder, the bolt breaks at the neck again, leaving the cylinder in the safe, exactly as a sidewise blow breaks off the stopper, leaving its shank in the bottle.

"The crease or junction of the lines composing the countersunk bolt would enable the burglar to break off the head so as to avoid the necessity of cutting away the projection, as he would be required to do in the case of the Hall conical bolt."

Millward, Record, 19, Q. 20.

"Owing to the presence of the crease I referred to, it can be broken off entirely by the side prying tools of the burglar, in my opinion, before the plates are stripped." "I have frequently accomplished the thing myself, by the introduction of